



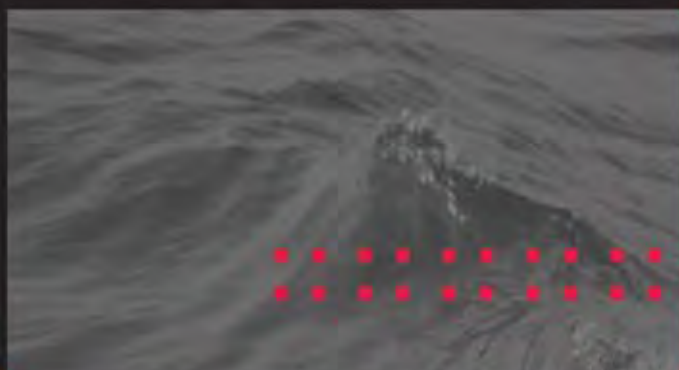
APPENDIX B. ResQmax Line Gun Operation Manual



This page is intentionally blank.



Operation Manual



ResQmaxTM
the NEW Generation

"The Global Leader in intrinsically safe line-throwing equipment"



Warnings

This equipment is intended to be used by rescue professionals trained in the use of similar equipment. Misuse of this equipment may cause bodily injury or death. Manufacturer disclaims all liability resulting from the use of this equipment in any manner other than that prescribed by the manufacturer.

The ResQmax is extremely powerful and propels a projectile at high speed. It is NOT a firearm, but the same precautions should be used. If misused, this equipment could cause serious bodily injury or death. Handle all components with the appropriate care.

DO NOT deploy the ResQmax directly at any person or property. Always aim beyond a victim in the water when performing training or an actual rescue. When testing or training with the ResQmax, make sure that no persons or property are in the vicinity of the target.

The ResQmax requires proper training and servicing. If you are not familiar with this equipment or are unwilling to follow the recommendations as outlined in this Operation Manual, then you should not operate this equipment. The user must follow recommended servicing and maintenance guidelines to ensure the long-term integrity and safety of the ResQmax.

The Grappling Hook offered with the ResQmax is for use to establish a line only -- or for recovery of mooring lines -- and should not be used for the support of a human being.

If you are uncertain about the proper usage, care, maintenance, or any other aspect of this equipment, call Rescue Solutions International, Inc. directly at 800.709.5018 or by email at info@resqmax.com.

Service (Refer to page 34 for Service Recommendations)

Any service or maintenance other than items described in this manual must be performed by a technician certified by the Manufacturer to perform such work. It is the purchaser's responsibility to register the product with the Manufacturer. Failure to complete warranty registration will void the warranty. For your convenience a Service & Maintenance Record is provided on page 38 of this manual. It is the purchaser's responsibility to enter the date of purchase on the Service & Maintenance Record and to ensure that servicing is done in accordance with the Manufacturer's recommendations. Rescue Solutions International, Inc. offers FREE technical support. Call 800.709.5018 or email info@resqmax.com.

© 2008 Rescue Solutions International, Inc.
708 SW Umatilla Ave
Redmond, OR 97756 USA
800.709.5018 541.504.9301 fax
www.resqmax.com



Table of Contents

Introduction.....	5
Purpose of the ResQmax.....	5
Applications.....	5
Range	5
Pressure/Distance Chart.....	6
Safety Features.....	6
Multi-Shot Capacity.....	6
Fueled by Compressed Air	6
Main Components & Accessories	7
Launcher	7
Line Containers.....	7
Folding Stock	7
Streamline Filler Hose Assembly	8
Line Projectile.....	8
Sling Projectile.....	9
Red Training Projectile.....	9
Phosphorescent Projectile	9
Grappling Hook Option	9
Line Options	10
Carry Bag.....	10
Pelican Rigid Transport/Storage Case.....	10
Filling & Storage of Projectiles	11
Filling the Projectiles	11
Storing Projectiles.....	13
Using the Folding Stock.....	15
Using the Folding Stock.....	15
Packing & Connecting the Line Container.....	16
Packing the Line Container.....	16
Connecting the Launcher to the Line Container.....	18
Safety Assembly & Launcher Bleed Screw	19
Safety Push Knob	19
Re-Setting the Safety	19
Launcher Bleed Screw Operation.....	20



Valve Key	21
Opening the Nozzle Valve to Pressurize the Launcher	21
Closing the Nozzle Valve in the Launcher	21
Projectiles	22
Using the Line Projectile	22
Protecting the Cylinder/Projectile	22
Attaching the Sling to the Projectile	23
Inserting Projectile in Launcher	23
Attaching the Grappling Hook to the Projectile	24
Checking Projectile Pressure	25
Removing a Charged Projectile from the Launcher	25
Operation	26
Deploying the ResQmax	26
Adverse Weather Conditions - Sling Only	27
Re-Packing the Sling/Burst Capsule	27
Using the Sling During Training	30
Maintenance	31
Care of the Projectile(s)	31
Replacement of O-Rings in Nozzle Valve	32
Replacement of the Nozzle Pressure Relief Assembly	33
Service	34
Frequently Asked Questions	35
Service & Maintenance Record	38
Limited Warranty	39





Introduction

Purpose of the ResQmax

The ResQmax is a new generation line-throwing & rescue appliance fueled by compressed air specifically designed to deploy:

- a line only,
- an auto-inflating flotation sling & retrieval line, or
- a grappling hook and retrieval line

to an otherwise inaccessible point in both land-based and maritime environments. The ResQmax provides an emergency response capability without putting the rescuer at risk.

Your ResQmax comes completely assembled and ready for operation, except for filling with compressed air. Adequate training in all aspects of the use of this equipment is essential in order to familiarize yourself with its safe operation and capabilities. **Review all instructions in this ResQmax Operation Manual and accompanying Training CD prior to first use.**

Applications

Some applications of the ResQmax include:

- swift water rescue
- ice rescue
- surf rescue
- man overboard rescue/recovery
- ship to ship line deployment
- ship to shore line deployment
- retrieval of mooring lines
- deployment of spill containment booms
- technical high angle/rope rescue
- deployment of grappling hooks

Performance Range

The range of the ResQmax varies depending on:

- Type and weight of line used
- Type of projectile and/or accessories used
- Air pressure in projectile at time of deployment

This chart provides conservative distances achieved when used by trained personnel in reasonably calm conditions:

Conservative Distances

Part #	Description	with Line Projectile		with Sling Projectile		with Grappling Hook ★	
		ft	m	ft	m	ft	m
803	4mm Spectra	400	104	300	92	285	87
804	6mm Spectra	330	87	270	82	260	80
805	3mm Dacron	400	107	300	92	285	87
806	8mm Polyspectra	275	76	200	61	190	58
807	8mm Polypropylene	225	69	200	61	190	58
808	6mm Polypropylene	300	92	230	70	220	67

★ Horizontal Deployment

In an emergency situation, additional distances may be achieved by using the equipment at higher pressures. There is a significant safety margin engineered into each unit – permitting safe operation of the units at pressures equal to 120% of rated service pressure on a case-by-case basis.





Note:

Distances shown on this chart may be achieved by personnel expert in the use of this equipment and under optimum operating conditions.

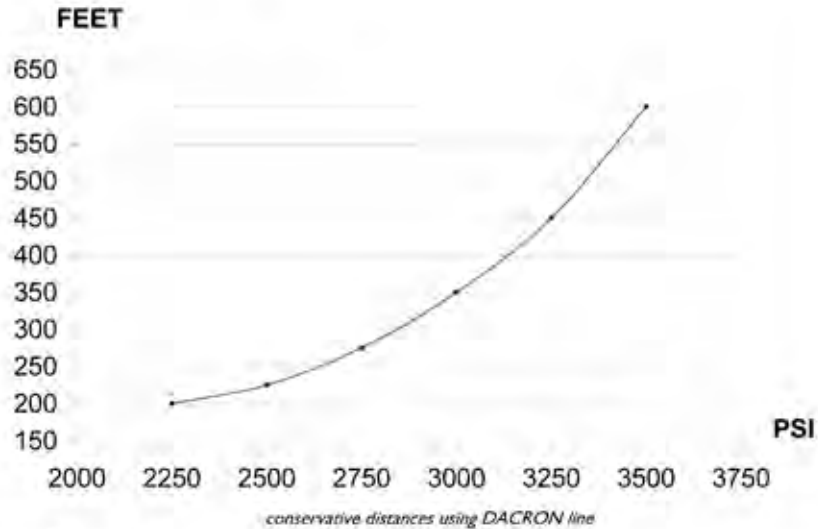
Note:

When installed in the Launcher, the Projectile Nozzle Valve should remain closed at all times except immediately prior to discharge.

Note:

This equipment is **NOT** oxygen safe! Never use a compressed air mixture that includes an elevated level of oxygen.

Pressure / Distance Chart



Safety Features

The Launcher Safety Assembly automatically engages each time a projectile is inserted, preventing accidental launch of a projectile. An audible "Click" is heard as the projectile engages, signaling that the projectile is safely engaged with the launching mechanism.

A Pressure Relief Assembly is installed in the nozzle of each projectile. Its purpose is to prevent any unsafe pressure build up in a filled projectile, whether in the launcher or not, if exposed to extreme heat, such as, from a fire. This Pressure Relief Assembly will rupture if the air pressure goes over a safe limit. The Pressure Relief Assembly is not reusable and must be replaced if it should ever fail.

A second Pressure Relief Assembly is installed on the launcher mechanism and is active at all times when the mechanism is pressurized.

Multi-Shot Capacity

Our patented Nozzle-Valve Assembly permits any number of projectiles to be pre-charged and stored with each unit, allowing deployment of multiple projectiles in rapid succession.

Fueled by Compressed Air

The intended fuel for this system is compressed air - which is non-flammable and non-combustible.

CAUTION: The use of any other compressed gas - either flammable and/or combustible, may result in a spontaneous explosion causing severe injuries or death.



Main Components and Accessories

Launcher #500



Figure 1. Launcher, right side view



Figure 2. Launcher, left side view

Line Containers #772; 773

The line container for your ResQmax will be selected according to your line needs and intended usage. Different line options require the large container (fig. 1) while others may utilize the compact line container (fig. 2).

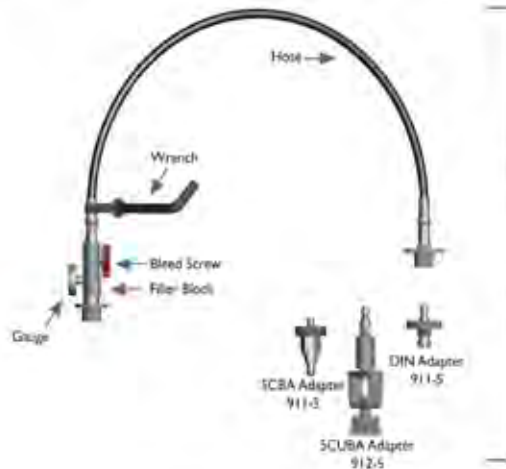
Folding Stock #703

The Folding Stock is a useful accessory of the ResQmax and enhances the operator's ability to aim the projectile more accurately. (fig. 2) When in the folded position the stock becomes a convenient carrying handle. (fig. 1)



Streamline Filler Hose Assembly #911-S; 912-S; 913-S

The Streamline Filler Hose Assembly is used to deliver compressed air from a compressor, a SCBA bottle, or a SCUBA bottle to the projectile cylinder. This provides the "charge" for the launcher. Specific fittings must be used for interfacing with each of the following – North American SCBA – European SCBA (Din) – Japanese SCBA – and SCUBA. Please ensure that your Streamline Filler Hose is equipped properly for your source of compressed air.



Streamline Filler Hose Assembly
available with different adapters:

SCBA	911-S
SCUBA	912-S
DIN/Euro	913-S
Japan /	914-S
South Korea	

Figure 3. Streamline Filler Hose Assembly

Note:

If the projectile cylinder shows signs of damage it must be removed from service immediately.

Line Projectile #300-S

The line projectile will deploy a variety of line over a range of distances, depending on the service pressure and the type of line used. The standard projectile protector is intended to protect the projectile cylinder from damage on contact. If the protector shows signs of damage after use it must be removed, the cylinder must be inspected, and the projectile cover must be replaced.



Figure 4. Line Projectile 300





Sling Projectile #301-S

The sling projectile will deploy an auto-inflating flotation sling and retrieval line to a victim in the water. The inflatable sling is fitted with a water-activated device that inflates the sling automatically on contact with water, providing sufficient buoyancy to support a 300lb/136kg victim. Each Sling is equipped with a replaceable water activated strobe light which will provide 24 hours of continuous use when immersed in water.



Figure 5. Sling Projectile #301-S



Figure 5a. Auto-inflating Sling #980

Red Training Projectile #305-S

This projectile is designed for training or for repeated use when deploying a line from the launch point to a hard surface as "ship-to-ship" line deployment.

The factory installed protective cover is manufactured from a low-recoil urethane material providing protection for the projectile and reducing projectile "bounce" on contact.



Training Projectile - #305-S

Phosphorescent Projectile - #306-S

Phosphorescent Training Projectile #306-S

The factory installed phosphorescent Protective Cover combines the best features of high initial brightness and long after glow for visibility during night-time use. The pigments used respond quickly to excitation by daylight, incandescent light, fluorescent, or ultraviolet light. This excitation process can be repeated indefinitely.

Figure 6. Training & Phosphorescent Projectiles

Grappling Hook Option #750

The grappling hook is manufactured from titanium to provide the best balance between strength and weight. The hook (fig. 6a) is offered for use to establish a line only or for the recovery of mooring lines and is not to be used for the support of a human being.



Figure 6a. Grappling Hook - #750





Line Options

Part #	Description	Minimum Break Load		Weight per Length		Length	
		lbs	kg	lbs	kg	ft	m
803	4mm Spectra	1500	680	1.75	.8	500	152
804	6mm Spectra	3000	1360	3.50	1.6	500	152
805	3mm Dacron	500	225	1.95	.9	500	152
806	8mm Polyspectra	2200	1000	4.80	2.2	300	92
807	8mm Polypropylene	1500	680	4.60	2.1	300	92
808	6mm Polypropylene	900	400	2.10	1	300	92

★ Custom line options to meet user requirements are also available.

Carry Bag #907

The Kit Carry Bag measures 13" w x 27" l x 18" h (35 cm x 70 cm x 45 cm) and is made from 1000 denier Cordura fabric, with 2 external zippered pockets and one internal zippered pocket, and has a weatherproof membrane over the entire footprint.



Figure 7. Carry Bag #907

Pelican Transport/ Storage Case #908; #909

The unbreakable, watertight, dustproof, chemical resistant, and corrosion proof case with lifetime guarantee, may be adapted to fasten to the railing of a platform, or to the stern rail of a vessel, making the ResQmax immediately available in the event of an emergency. When equipped with an extending handle and rollers, this case is used for transport and storage of your unit.



Figure 8. Pelican Transport/Storage Case #908



Filling and Storage of Projectiles

Filling the Projectiles

To properly fill the projectile you need a source of compressed air that is at least capable of reaching the service pressure of the projectile. The standard projectile has a service pressure of 3000 psi / 207 Bar.

The **Streamline Filler Hose Assembly** is required to recharge the projectiles with compressed air. It consists of a **Filler Block**, that includes a Pressure Gauge and Bleed Screw, and the filler hose connecting the compressed air source.

Begin by attaching the end of the Streamline Filler Hose Assembly, equipped with the proper adapter, to your compressed air source. (see fig 3)

Next, check that the valve key on the projectile to be filled is in the open position. When the valve key is in-line with the flow of air, the valve is open (fig 9a).



Figure 9a

When perpendicular to the flow of air the valve is closed (fig 9b)



Figure 9b

To charge the Projectile Cylinder:

1. Retract the spring-loaded collar on the Streamline Filler Hose Assembly (fig 9c) and attach the Filler Hose Assembly to the projectile. (fig 9i)
2. Insert the neck of the nozzle into the collar and release collar. (fig 9d) Ensure that the red bleed screw on the Streamline Filler Hose Assembly is closed, by turning in a clockwise direction.

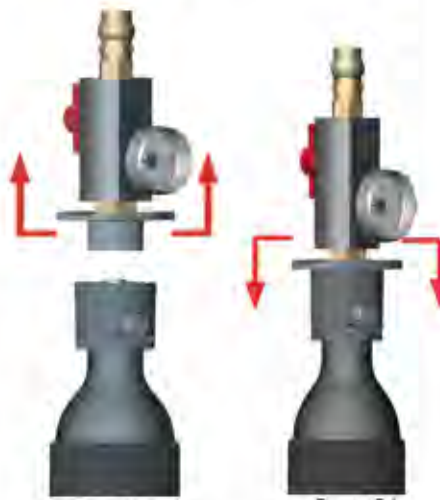


Figure 9c

Figure 9d

Note:

Use **Compressed Air Only**. The use of any flammable or combustible compressed gases, especially at high pressures, may result in a spontaneous explosion causing severe injuries or death.

Note:

The operating/ service pressure of the projectile should only be exceeded in response to a life-threatening emergency -- and under no circumstances should it be exceeded by more than 20%. Ignoring this advice may cause an accident that could result in bodily injury or death.





Note:

Attempting to fill the projectile with the Nozzle-Valve closed will result in damage to, or loss of the o-ring on the face of the Nozzle Plug. This must be replaced prior to proceeding. See Figure 24b.

3. Ensure that the **Nozzle-Valve** is in the **OPEN** position – with the valve “in line” with the flow of air. (fig 9e)



Figure 9e

4. Open the air-supply and **VERY SLOWLY** fill the projectile bottle to 3,200 psi./220 Bar. (If you hear air escaping the o-ring in the Filler Block or Nozzle needs to be replaced. - see page 32)

5. Close the air supply.

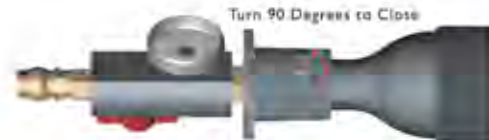


Figure 9f

6. Remove the wrench from the Streamline Filler Hose assembly and close the valve key in the projectile by turning it 90 degrees. (fig 9f)



Figure 9g

7. Ensure that the valve key is perpendicular to the flow of air (fig 9g). Always replace the Filler Hose Wrench back in the lanyard on the Filler Hose.

8. Next, locate the drain port adjacent to the red bleed screw (fig 9h).

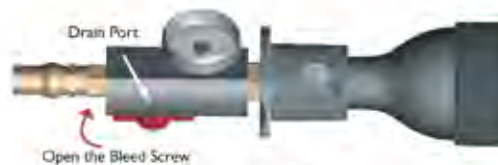


Figure 9h

9. Point the drain hole down and away from the operator and turn the bleed screw in a counter-clockwise direction, draining pressure from the Filler Hose Assembly.



10. Retract the spring-loaded collar on the Streamline Filler Hose Assembly (fig 9i) and detach the Filler Hose Assembly from the projectile. (fig 9j)

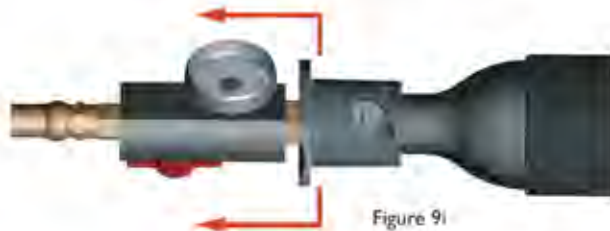


Figure 9i



Figure 9j

11. Store the re-charged projectile in a safe location.

Storing Projectiles

Projectiles that are charged and ready for use should be stored in a constant temperature environment and protected from the elements. Charged projectiles should be so marked. The pressure level of the stored projectiles should be checked periodically to verify that the desired service/operating pressure is being maintained.

Caution: If projectiles are subjected to extreme heat, the pressure could rise sufficiently to rupture the Pressure Relief Assembly, allowing the air to escape and temporarily preventing use of the equipment. Refer to page 33 for instructions on removing and replacing the Pressure Relief Assembly.



THIS PAGE INTENTIONALLY LEFT BLANK



Using the Folding Stock

To extend the Folding Stock from the collapsed position, to the firing position, push downward at the butt of the Folding Stock and apply pressure with your thumb. This will release the Folding Stock from the sighting hook. (fig. 10a-- Step 1) Rotate the Stock to the rear of the launcher. (fig. 10a -- Step 2) The Stock Catch Plate will automatically engage.



Figure 10a. Using the Folding Stock

To collapse the Folding Stock, (for use as a handle) pull back on the Stock Catch Plate with your thumb to disengage the catch. (fig. 10b -- Step 1) Fold the Folding Stock over the top of the Barrel (fig. 10b -- Step 2) and engage the butt of the Stock with the sighting hook on the front of the Barrel. (fig. 10b -- Step 3)



Figure 10b. Using the Folding Stock



Packing and Connecting the Line Container

Note:

The eyelet on the launcher is not intended to be used in the recovery of a victim from the water, or in conjunction with a messenger line. Pull directly on the line.

Packing the Line Container

All lines used with the ResQmax may be re-packed in the field by hand as necessary, without the use of any special equipment. Each line has a dedicated "dead end" & "live end".

The "dead end" of the line is formed by a loop with a snap shackle attached. This "dead end" is intended to be attached to the launcher before and during deployment. The line may be secured to any fixed point prior to or after firing – to secure one end of the line while the launcher is being prepared for the next shot. This "dead end" does not travel.

The "live end" of the line is formed by a loop with a Cut-Away Pin permanently attached. This end is intended to be attached to the bridle lines of the Line or Sling Projectile and does travel with the projectile towards the target. The Cut-Away Pin holds the door closed until the point of launching – and then automatically releases the door of the line container to allow the line to follow the projectile without resistance.

When packing the line container, the easiest method is as follows:

1. Disconnect the line container from the launcher, and hold it vertically, with the door open toward you.
2. Allow 12 inches / 30cm of the "dead end" of the rope (fitted with the snap shackle) to hang freely outside of the right side of the line container (fig 11a) and begin dropping the line inside the container.
3. Pull the line from over your shoulder so that you can push it down into the container hand over hand, using short strokes.
4. Allow the line to 'fall' into the container in a random, criss-cross pattern to avoid any snarls when it is deployed. Periodically push the line down into the bag more tightly to make more room.

Note:

DO NOT coil or loop the line, EVER! If you coil the line you may build in tension that will cause snarls the next time you use it resulting in poor performance during deployment.



Figure 11a.



Figure 11b.



5. When all of the line is packed inside the container, close the container door – leave the “live end” of the rope – with the Cut-Away Pin permanently attached through the notch on the left hand side of the door catch and the “dead end” of the rope through the notch on the right hand side.
6. Fasten the line container door closed by inserting the Cut-Away Pin (fixed to the “live end” of the line) through the black elastic retaining loop that protrudes through the line container door in the closed position.
7. Re-install the line container on the launcher (fig 12a) – and connect the snap shackle on the “dead end” of the line to the molded eyelet behind the inverted “T” bracket of the launcher.
8. Connect the quick-connect link attached to the bridle lines of the projectile, to the “live end” of the line protruding from the line container. Your unit is ready to launch.



Figure 11c.



Figure 11d.

Note:

The main line and bridle lines should be inspected after each use for fraying or damage before storing for later use. If immersed in seawater during use, all lines (and projectiles) should be rinsed with fresh water and dried thoroughly. Inspect the line before packing and then pack as instructed in this packing section. Any damaged or frayed line or bridle lines must be permanently removed from service.

Remember:

If immersed in seawater, all lines and projectiles must be rinsed with fresh water and dried thoroughly after use, and prior to being refilled or stored.



Connecting the Launcher to the Line Container

1. Place the inverted "T" bracket (on the bottom of the Barrel at the front) on top of the line container, just behind the inverted "T" groove on the upper portion of the front of the line container: (fig 12a -- Step 1)
2. Locate the bottom of the handle so that notches on the handle will engage with the flange at the rear of the line container: (fig 12a -- Step 2)
3. Slide the launcher forward inside both the front and rear grooves of the line container simultaneously. Push firmly forward until the catch on the launcher automatically engages in the locking hole in the line container: (fig 12a -- Step 3)
4. Attach the "dead end" of the line (with snap shackle) to the eyelet behind the "T" Bracket on the underside of the barrel casing. (see Figure 11d). This will ensure that the line does not separate from the launcher after discharge. Alternatively, the dead end may be lashed to a secure anchor prior to or after discharge, while the launcher is readied for subsequent shots.
5. Attach the quick-connect link on the projectile bridle lines to the "live end" of the line.



Figure 12a. Connecting the Launcher to the Line Container

To Disconnect the Line Container from the Launcher push down on the Line Container Catch located at the front of the Launcher, just below the barrel opening, and slide the launcher rearward: (fig 12b -- Steps 4 & 5)



Figure 12b. Disconnecting the Launcher from the Line Container

Note:

If there is line in the container it is first necessary to disconnect the "live end" from the bridle lines and the "dead end" from the launcher eyelet...



Safety Assembly & Launcher Bleed Screw

Safety Push Knob

The Safety Push Knob is a circular black button located on the same side of the launcher as the Valve Key, and directly above the trigger.

This Safety Push Knob is at rest when protruding slightly from the side of the launcher housing. (fig. 14a)

The Safety Assembly engages automatically each time that a projectile is inserted into the launcher. An audible "Click" indicates that the safety has engaged.

Press the Safety Push Knob to the "off" position immediately before firing the launcher. When in the "off" position the Safety Push Knob remains recessed inside the cavity about $\frac{1}{4}$ " or 6 mm. (fig. 14b)

After firing the launcher, the Safety Assembly will re-set itself to accept the next projectile. When a new projectile is loaded, the trigger will automatically move forward and the safety will engage.

Re-Setting the Safety

If the Safety Push Knob has been pressed to the "off" position – and for any reason it becomes necessary to re-set the Safety without firing the launcher – reach inside the cavity holding the Safety Push Knob and rotate the Safety Push Knob clockwise. A rotation of only a few degrees is required. (fig. 14c) The Safety Push Knob will return to its rest position, protruding slightly from the side of the launcher housing – indicating that the Safety Assembly has been re-engaged and is in the "on" position. (fig. 14a)



Figure 14a



Figure 14b



Figure 14c

Note:

If the trigger is moved forward manually prior to another projectile being inserted, it is necessary to press the Safety Push Knob to release the safety internally, prior to inserting another projectile



Note:

There is a small nylon insert pressed into the threaded end of the Bleed Screw which acts to seal the opening when the Bleed Screw is tightened. If the Bleed Screw is removed entirely, for maintenance or any other reason, ensure that the nylon insert remains fixed to the Bleed Screw prior to returning the ResQmax unit to service. See Fig 15b.

Launcher Bleed Screw Operation

Each Launcher is equipped with a Bleed Screw – located near the ResQmax label on the Launcher. (see fig. 2) The Bleed Screw Handle swivels over the Bleed Screw Bolt, to permit the Bleed Screw to be turned without interfering with the Folding Stock.

One purpose of the Bleed Screw is to:

- Permit the operator, if necessary, to reduce the operating pressure of the Projectile prior to discharge, as follows:
 1. Open the Nozzle Valve to pressurize the Launcher. (see page 21)
 2. Rotate the Bleed Screw Handle in a counter-clockwise direction until you hear air escaping.
 3. Monitor the Pressure Gauge until the desired operating pressure is achieved.
 4. Rotate the Bleed Screw Handle in a clockwise direction to stop the escape of air.

The second purpose of the Bleed Screw is to:

- Permit the operator to bleed off the pressure in the Mechanism in order to remove a charged Projectile, as follows:
 1. Close the Nozzle Valve in the Launcher. (fig 16d)
 2. Rotate the Bleed Screw Handle in a counter-clockwise direction until you hear air escaping.
 3. Monitor the Pressure Gauge until the reading is at "0".
 4. Rotate the Bleed Screw Handle in a clockwise direction to tighten.
 5. The Projectile may now be removed by pressing the Safety Knob and pulling the Trigger.



Figure 15a



Figure 15b



Valve Key

Opening the Nozzle Valve to Pressurize the Launcher

The Valve in the Nozzle of each Projectile is intended to be opened using the Valve Key attached to the Launcher Housing. The "V" groove on the Nozzle Protector properly aligns the Nozzle Valve with the Valve Key. The Valve Key is not engaged with the Nozzle Valve when fully extended (fig. 16a). The Valve Key is engaged with the Nozzle Valve when fully depressed (fig. 16b).



Figure 16a - Valve Key NOT Engaged



Figure 16b - Valve Key Engaged

When installed in the Launcher, a freshly charged Projectile will have the Nozzle Valve in the vertical position.

To **OPEN** the Nozzle Valve on the Projectile, do as follows:

1. Press valve key all the way in, while in the vertical position, so that the valve key makes contact with the nozzle valve. **Maintain constant pressure.** (fig 16b - Step 1)
2. While pressing in, rotate the Valve Key 90 degrees in a clockwise direction. (fig. 16c - Step 2)
3. Release the Valve Key allowing it to extend fully. (fig. 16d)



Figure 16c - Opening Valve

Closing the Nozzle Valve in the Launcher

If the Valve in the Nozzle of a Projectile is open, the Nozzle Valve will be in the horizontal position.

To **CLOSE** the Nozzle Valve on the Projectile, do as follows:

1. Press the valve key all the way in, while in the horizontal position. **Maintain a constant pressure.** (fig 16d - Step 3)
2. While pressing in, rotate the Valve Key 90 degrees in a counter-clockwise direction. (fig 16d - Step 4)
3. Release the Valve Key allowing it to extend fully (see fig. 16a-- above)



Figure 16d - Closing Nozzle Valve

Note:

Some initial resistance may be experienced when trying to turn the Valve Key. However, once the Key begins to rotate it will turn easily. Be certain to rotate the Key clockwise, a full 90 degrees.



Projectiles

Note:

Any damage to the projectile protector may indicate damage to the cylinder. If the protector is damaged the cylinder must be visually inspected for damage. Damaged protectors should be replaced to protect the projectile cylinder.

Using the Line Projectile

A black projectile cover (protector) (fig. 17a) is recommended when deploying a line with the ResQmax. Each line projectile is supplied with a protector slipped over the projectile cylinder.

The protector may be removed to inspect the projectile cylinder for damage and can be re-installed. If the protector shows any sign of damage (Fig. 17b), it should be removed immediately and the cylinder should be inspected.

To remove the training projectile cover, it may be necessary to cut it completely.



Figure 17a



Figure 17b

Protecting the Cylinder/Projectile

All practice deployments not using the Training Projectile SHOULD BE INTO WATER. The projectile is primarily a compressed air cylinder. IF THE CYLINDER SUSTAINS ANY VISIBLE DAMAGE FROM CONTACT WITH A HARD SURFACE THEN IT MUST NOT BE RE-USED.

A cylinder with minor scratches to the paint (Fig 17c -note 1) may be returned to service.

However, if the cylinder surface shows any signs of deformation (indentation or deflection) (Fig 17c -note2), the cylinder must be removed permanently from service.

If deployed into water, the projectile can be used over again hundreds of times. Use caution when pulling the projectile back to avoid damaging it. Always wash in fresh water. Remove all water from inside cylinder and allow to dry before storage or re-filling.



Figure 17c



Attaching the Sling to the Projectile

The Sling is an auto-inflating flotation harness which is contained in a Sling Burst Capsule (fig 5a) and which may be attached to a projectile for deployment to a victim in the water. Once the Burst Capsule is immersed in the water the Sling inflates automatically – providing buoyancy to a victim. The Sling Burst Capsule may not be used with a projectile protector. Attach the Sling Burst Capsule to a Projectile, as follows:

1. Place the Sling w/ Burst Capsule on the end of a projectile. (Do not use a projectile protector – as the Burst Capsule is designed to fit directly onto the metal projectile cylinder.) (figure 18a)



Figure 18a

2. Place the loop of the sling's bridle line over the nozzle and neck of the projectile cylinder. (Fig 18b)
3. String the projectile bridle lines through the nozzle assembly and connect the bridle line loops with the quick-connect. (as shown in Figure 19b)



Figure 18b

4. Insert the projectile into launcher.

Inserting Projectile In Launcher

The bridle lines are used to connect the projectile to the rescue or messenger line. Connect the bridle lines and install the projectile in the launcher as follows:

1. Pull the quick-connect that connects the bridle lines to allow the projectile to find the center-point of the bridle lines. (fig. 19b)
2. Press the "Safety Push Knob" to ensure that the safety is in the "off" position internally.
3. Insert the line projectile into the launcher with the "V" in the Nozzle Protector upward, keeping the bridle lines tight and uncrossed along each side of the projectile. Rotate the projectile as necessary until you feel the "V" groove engage with the mechanism. (fig 19a) Apply pressure to the projectile, an audible "Click" will signal that the projectile is engaged with the mechanism.
4. Connect the quick-connect holding the bridle line loops to the loop in the "live end" of the line – protruding through the notch on the line container door. Use care not to disengage the Cut-Away Pin which fastens the line container door closed. (See page 17 Fig 11d)



Figure 19a



Figure 19b

Note:

If the Sling with Burst Capsule is not properly attached to the projectile bridle lines, the Sling may become separated from the line after it inflates in the water. If it becomes separated from the line it will be necessary to retrieve the Sling with the use of a boat or by other means.

Note:

If you do not get the Nozzle Protector lined up properly the nozzle will not be able to slide into the mechanism. An audible "Click" indicates the Safety Assembly is engaged.



Note:

The Grappling Hook offered with the ResQmax is for use to establish a line only – or for recovery of mooring lines – and should not be used for the support of a human being.

Attaching the Grappling Hook to the Projectile

The Grappling Hook is a lightweight titanium hook intended to be used for establishing a line, such as, across a river or stream or to recover a mooring line from the water. The Grappling Hook may not be used with a projectile protector. Attach the Grappling Hook to a Projectile, as follows:

1. Prepare projectile with bridle lines, as shown in Fig 19b.

2. Lash the “live end” of the line to the line eyelet on the shaft of the Grappling Hook, using a bowline or similar secure knot.

3. Install the Grappling Hook Assembly over the blunt end of the Line Projectile cylinder;

4. Run the line along the side of the charged Line Projectile to the neck of the cylinder;

5. Fasten the line to the neck of the Projectile Cylinder with velcro strap provided and return the line to the end of the projectile with the grappling hook, on the opposite side of the cylinder.

6. Insert the line projectile into the launcher with the “V” in the Nozzle Protector upward, keeping the rescue line and the bridle lines tight and uncrossed along each side of the projectile. Rotate the projectile as necessary until you feel the “V” groove engage with the mechanism – and apply pressure to the projectile. An audible “Click” will signal that the projectile is engaged with the mechanism.

7. String the bridle lines through the loop in the bowline knot or the eye on the grappling hook. (This will ensure that the projectile is not lost if the projectile and grappling hook nose cone become disconnected.)

8. Pull the quick-connect on the bridle lines until the center-point of the bridle lines is attained.

9. Connect the quick-connect on the bridle line to the Cut-Away Pin on the line container.

You are now ready to deploy the Grappling Hook.



Figure 20a



Figure 20b



Figure 20c



Figure 20d



Checking Projectile Pressure

All stored projectiles should be checked on a regular basis to ensure that the service pressure is maintained. To check the projectile pressure, do as follows:

1. Load it into the launcher.
2. Open the Nozzle Valve.
3. Confirm the projectile pressure using the reading on the Pressure Gauge. (If there is too much pressure, see page 20 for directions on how to relieve pressure.)
4. **Close the Nozzle Valve.**
5. Rotate the bleed screw counter-clockwise to release the air from the mechanism. Pressure Gauge must read 0.0 psi/bar.
6. Release safety device by depressing the Safety Push Knob.
7. Release the projectile by pulling the trigger and return the projectile to storage.

Removing a Charged Projectile from the Launcher

If you wish to remove a charged projectile from the launcher without firing it:

With NO pressure indicated on the launcher gauge:

1. Push in the safety button.
2. Pull the trigger, releasing the projectile.

With pressure indicated on the launcher gauge:

If you have the launcher ready to fire and have pushed in the Safety Push Knob but change your mind about firing for some reason OR if you are handed a launcher with pressure indicated on the gauge:

1. Reengage the safety by rotating the Safety Push Knob a few degrees in a clockwise direction while pushing it in with your thumb. When pressure is released, the Safety Push Knob will return to the 'at rest' position. (fig 14a) Do not over-rotate, only a few degrees of movement is necessary. (fig. 14c)
2. Close the Nozzle Valve by depressing the Valve Key in the horizontal position and rotating it counter-clockwise 90 degrees – to the vertical position. Release the Valve Key. (fig 16d)
3. Open the Bleed Screw and allow the air in the mechanism to escape. The Pressure Gauge will drop to a reading of "0". (fig 15a)
4. Push in the Safety Push Knob.
5. Pull the trigger to release the projectile.

Note:

Repeated pressure checks of a projectile will result in a gradual lessening of pressure. It will be necessary to top it up using the procedure as described on page 11. This is also a good opportunity to have a practice launch.

Note:

If the Pressure Gauge on the Launcher does not show "0" pressure – Turn the Bleed Screw in a counter-clockwise direction, and allow the pressure from the Mechanism to escape before attempting to remove the projectile.



Operation

Note:

Even if the victim is inside the maximum range of the launcher, still shoot the ResQmax to its maximum distance. NEVER AIM DIRECTLY AT THE VICTIM!

Note:

Adequate training in all aspects of the use of this equipment is essential in order to familiarize yourself with its safe operation and capabilities -- and to deploy it with accuracy.

Deploying the ResQmax

1. Conduct a visual inspection to ensure that the bridle lines are properly connected to the "live end" of the line -- and that the "dead end" of the line is connected to the eyelet on the launcher or otherwise secured. (fig 11c - d)
2. If deploying the Sling, check to ensure that the lines from the burst capsule are properly attached around the cylinder neck of the projectile. (fig 18a - b)
3. Fully depress the Valve Key in the vertical position, and rotate the Valve Key 90 degrees clockwise to the horizontal position. Release the Valve Key. (fig 16b - c)
4. Check the pressure gauge to verify pressure. (No pressure reading on the gauge may indicate that you did not successfully open the valve in the nozzle or that your projectile was not charged with air when loaded in the launcher.)
5. Press the Safety Push Knob to the "off" position to disengage the safety. (fig 14b)
6. Hold butt of the folding stock against your shoulder, as you would a firearm, at a 35-degree angle aiming OVER the victim. (fig 21a)



Figure 21a

7. Squeeze the trigger with two fingers. Hold the ResQmax steady as the projectile leaves the launcher and the line "pays out."



Adverse Weather Conditions - Sling Only

When deploying in adverse weather conditions with water spray or heavy rain, do not expose the ResQmax's burst capsule and Sling to excess water as the auto-inflator may inflate the Sling before you make the deployment. It is packed into the burst capsule and designed to inflate within 3-5 seconds after submersion in water, but heavy exposure to rain or spray for a period of time could also cause the Sling to inflate.

Re-Packing the Sling/Burst Capsule

The Sling projectile comes packed and ready for first use. After each deployment into water, you will need to replace the CO₂ cartridge and soluble bobbin and use a new Sling Burst Capsule. To repack your Sling use the following steps:

1. Deflate the Sling COMPLETELY. (NOTE: it will not fit into the plastic burst capsule unless this is done.) Insert the black cap upside down on the red oral inflator tube to release all the air. (fig 22a)
2. Once the Sling is completely deflated, re-install the black cap over the oral inflator tube. (fig 22b) See also **Note** at right.
3. After each deployment rinse all components thoroughly in fresh water.
4. Allow all components to dry completely.
5. Unscrew the bobbin cap from the auto-inflator and remove the used yellow plastic bobbin. (fig 22c)
6. Insert a new bobbin into activator with white surface facing up. Do this FIRST, before you replace the CO₂ cartridge.
7. Screw bobbin cap back into place tightly.
8. Remove used CO₂ cartridge, turning it counter-clockwise.
9. Install new CO₂ cartridge firmly into place.
10. Fold the Sling in half and then in half again.



Figure 22a



Figure 22b



Figure 22c

Note:

Once the air has been completely removed from the Sling, re-install the black cap properly on top of tube. If the black cap is left inverted inside the red oral inflator tube, the CO₂ will escape from the Sling on activation.

Note:

Before replacing the soluble bobbin, make sure that the activator mechanism is thoroughly dry. A wet bobbin could accidentally activate the CO₂ cartridge.



11. Keep the auto-inflator on top of the folded sling. Organize the bridle and main lines so they are not tangled and are clear of the sling. Note position of strobe safety light. (fig 22d)

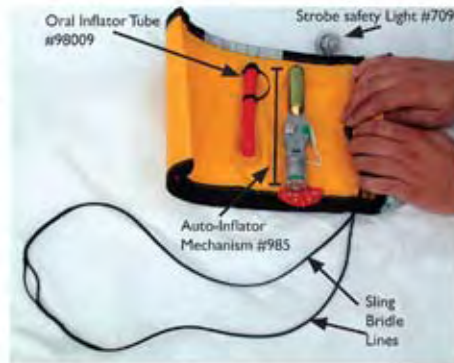


Figure 22d

12. Roll the sling tightly, with the auto-inflator on the inside of the roll. (fig 22d - e)

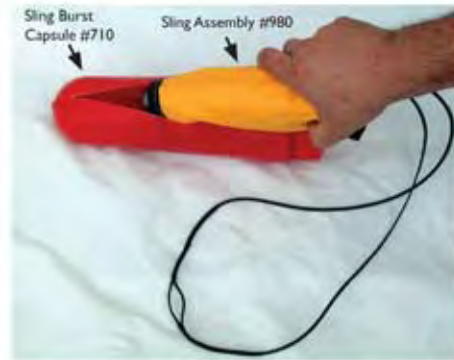


Figure 22e

13. Insert the rolled Sling into the plastic Burst Capsule through the slit in side. The bridle lines and bobbin cap must face the open end of the Burst Capsule. Insert one end first, then push the rest into the capsule. Squeeze the capsule back into shape. (fig 22f)



Figure 22f

14. Use Scotch Tape to hold the edges of the burst capsule neatly together for a more aerodynamic performance. The tape does not need to be removed prior to use.



15. Reach inside the open end of the burst capsule and gather up the slack in the bridle lines inside the capsule. (fig 22g)

16. Attach the burst capsule onto the end of the projectile cylinder. Follow the instructions "Attaching the Sling to the Projectile" (fig 18a - b)



Figure 22g



Tip:

During practice you do not have to replace the CO² cartridge and bobbin each time. HOWEVER, be certain that the CO² and bobbins are properly re-installed and ready for service prior to storing the unit.

Using the Sling During Training

After the first deployment and inflation, simply re-pack the Sling into a new plastic burst capsule without replacing the CO² cartridge. This allows you to practice without wasting cartridges or taking the time to wait for the sling to dry between each shot. (If you are practicing in a controlled environment where you actually have a victim in the water then the Sling can be pulled out of plastic burst capsule and manually inflated by the victim to simulate the rescue and retrieval.)



Maintenance

Care of the Projectile(s)

The projectile can be used over and over again if cared for properly. Any visible damage to the projectile on the exterior is cause for immediate replacement. **DO NOT ATTEMPT TO REFILL A DAMAGED CYLINDER.** This may cause an accident resulting in bodily injury or death. (Please reference section called 'Protecting the Cylinder/Projectile on page 22.)

After use and before filling again to be stored, the projectile should have the Nozzle Assembly removed and be allowed to completely dry inside. Often, especially if deployed into seawater, there will be water residue in the cylinder that may give rise to corrosion if not removed.

To dry the inside of the projectile cylinder:

1. Unscrew the Nozzle Assembly from the end of the projectile in a counter-clockwise direction. (fig. 23a)
2. Flush all parts, including the nozzle, with fresh water, shake out excess water, and let dry.
3. Inspect the inside and outside for any damage or corrosion.
4. Once dried, lubricate the threading on the Nozzle Assembly with Corrosion Block and replace, rotating in a clockwise direction by hand until snug. **DO NOT OVERTIGHTEN.** (fig. 23a)



Figure 23a

There is an o-ring on the projectile nozzle which is re-usable unless damaged. A replacement o-ring is included. Do **NOT** use any sealant or tape on the thread of the nozzle. Apply a small amount of Corrosion Block on the threads and use inside the projectile cylinder. Install the Nozzle Assembly tightly, using hand pressure. Do not over tighten the nozzle. Use Corrosion Block on any part of the projectile. (fig 23b)



Figure 23b -- Corrosion Block #715

Each projectile cylinder is intended to have a maximum service life of five years from the date of manufacture – and must be removed from service at that time – or sooner if there is any visible evidence of damage. Each cylinder is date stamped. It is the responsibility of the purchaser to ensure that the projectile cylinder is not used after the service life has expired.

Corrosion Block can also be used as a lubricant on the outer ring of the launcher mechanism by reaching in through the vent holes of the launcher. (fig 23b)

Note:

Inexpensive replacement cylinders are readily available from the manufacturer. **DO NOT use a visibly damaged cylinder!**



Note:

The Nozzle Plug "Face O-ring" is easily identified by its blue/green color. No substitute o-ring will provide adequate service or performance.

Important Note:

The beveled surface of the neck of the nozzle is subject to wear at the moment of launching. In normal conditions this part is suitable for 150 or more discharges. Carefully inspect this surface for excessive wear after each use. If there is any question regarding suitability of this part for continued use it must be removed from service and inspected by a qualified technician.

wear surface



Replacement of O-Rings in Nozzle Valve

If the projectile is unable to hold air, the o-rings on the Nozzle Plug in the Nozzle Valve may have become worn or damaged. It will be necessary to replace them. Only use the o-rings supplied by Rescue Solutions International. These o-rings are of a special composition and hardness, and are specially selected for this purpose.



Figure 24a -- Nozzle Valve Assembly #604

To Remove the Nozzle Plug:

1. Remove the Nozzle Assembly from the projectile by unscrewing it in a counter-clockwise direction.
2. Remove the o-ring from the Nozzle threads and slide the Nozzle Protector off of the Nozzle Body.
3. Remove the Nozzle Plug Retaining Clip from the Nozzle Valve Plug using circlip pliers.
4. Push the Nozzle Valve Plug downward, out of the Nozzle Body.

Once the Nozzle Valve Plug has been removed:

1. Remove and discard the old o-rings.
2. Remove and inspect the Pressure Relief Assembly.
3. Thoroughly clean the Nozzle Valve Plug as well as the bore of the Nozzle Body.
4. Lubricate the new o-rings with o-ring lubricant.
5. Slide the Nozzle Plug upper & lower o-rings into place on the Plug – using care.
6. Install the o-ring on the face of the Nozzle Plug, pressing it into place inside the groove around the opening.
7. Lubricate the bore of the Nozzle and the Nozzle Plug with a light film of petroleum jelly.



Figure 24b -- Nozzle Valve Plug



To reinstall the Nozzle Valve Plug:

1. Orientate the Nozzle Valve Plug so that it is in an open position – with the Face O-ring on the Nozzle Valve Plug turned at 90 degrees to the normal flow of air through the nozzle. (Figure 24c)
2. Gently insert the Nozzle Valve Plug into the opening, taking care not to cut the o-rings against the edges of the opening on the Nozzle Body.
3. Rotate the Nozzle Valve Plug slightly from side to side as you insert it to assist the o-rings to seat properly.
4. Once fully inserted, reinstall the Nozzle Valve Retaining Clip. (Replace the Retaining Clip if it shows any sign of damage.)
5. Slide the Nozzle Protector over the Nozzle Body – taking care to ensure that the aligning notch on the Nozzle Protector is engaged with the matching shape on the Nozzle Body.
6. Re-install the Pressure Relief Assembly.
7. Place the Bottle O-Ring around the threaded end of the Nozzle and screw the assembly back into the projectile cylinder.

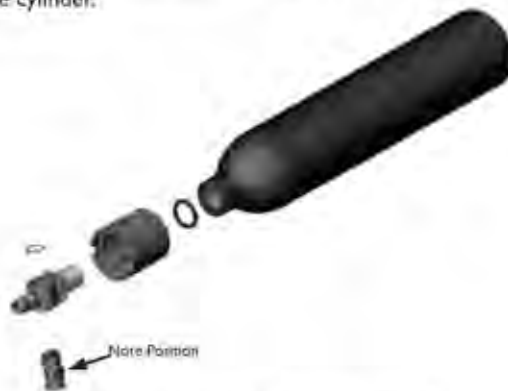


Figure 24c -- Reinstalling the Nozzle Valve Plug

Replacement of the Nozzle Pressure Relief Assembly

If the projectile is left exposed to extreme temperatures while charged, the Pressure Relief Assembly may rupture and need to be replaced.

1. Remove the Pressure Relief Assembly by turning counterclockwise using a T-30 Torx wrench.
2. Clear the opening and lightly lubricate with Corrosion Block.
3. Install a new Pressure Relief Assembly. (See Figure 24a for reference)



Service

Note:

As with all equipment, lack of use can often cause more damage to the launcher than regular, or even excessive use. At a minimum every launcher should be inspected by a technician trained in the maintenance of this equipment at 36 month intervals.

Wear on the components in this system are controlled by:

- The number of uses.
- The storage conditions and care the unit receives by the end user.

With good care and proper storage conditions the serviceability of the unit is predictable. However, if subjected to rough use, or if not kept clean and free from contaminants by the end user, the **need for service can be dramatically accelerated.**

Due to the high pressure of the compressed air used in this system the components of principal concern are the projectiles, (see pages 8 & 9) the nozzle valve assembly, and the launcher.

In order to observe recommended service intervals, it is imperative that the end user maintain a log tracking the number of uses of:

- each launcher firing, and
- each discharge of a cylinder & nozzle assembly.

The Manufacturer recommends that this equipment be serviced, by technicians trained and certified by the Manufacturer in the maintenance and repair of this equipment, at the earliest of the following events to occur:

For the Launcher:

- The first indication that there is any problem with the operation of the equipment,
- or when 300 shots have been logged, or
- three years from the date of purchase.

For the Projectile:

- The first indication of any physical external damage to the cylinder, or
- At the 5th year anniversary of the date of cylinder manufacture, as stamped on the neck of the cylinder.

For the Nozzle Valve Assy:

- The first indication that there is any problem with the operation of the equipment that cannot be corrected by the replacements of the o-rings (see page 32), or
- When excessive wear becomes evident on the beveled surface of the nozzle body, (see margin- Important Note: page 32), or
- When 150 shots have been logged on the nozzle valve assembly.

This Line Throwing & Rescue Appliance may need to be depended on in a variety of emergency situations. It is possible that in many of those emergency situations a human life may depend on the reliable operation and performance of this equipment.

In order to ensure that the equipment is at all times operationally ready the Manufacturer recommends that the purchaser takes the following actions:

- Provide adequate and frequent training in the operation of this equipment in actual field conditions.
- Implement and maintain a program for the regular review of the equipment to ensure that it is intact and complete, that projectiles are pressurized, and that the equipment is ready in all regards for use to respond to an emergency situation.

The internal mechanism in this appliance is complex – and any maintenance or repair other than that described in this manual should be performed by a technician trained by the manufacturer in the repair of this equipment. Please contact your Rescue Solutions International distributor for more information, call 1-800-709-5018 or e-mail at mail@resqmax.com.



Frequently Asked Questions

Q Why will the projectile not engage when I push it into the barrel?

A Two possible reasons:

1. The "V" groove on the Nozzle Protector is not being properly aligned with the mechanism. (Hold "V" upward – slide projectile into the barrel and rotate gently.) (fig 16a)
2. The Trigger has been manually moved forward since the last time a cylinder was removed – effectively leaving the Safety "on" even though the Launcher is empty. (Press the Safety Knob to release the Safety, and re-insert the projectile as described in 1.)

Q How can I tell if the Projectile has any air in it?

A If you have a projectile with the valve closed and are not sure if it is charged, you can check this by loading it into the launcher and opening the Nozzle Valve. If the gauge shows pressure, then it is charged and you may proceed to shoot or close the valve and remove the projectile. It is a good idea to develop a system to ensure that full and empty bottles are kept separately or marked with a label.

Q How do I re-engage the safety if I do not want to shoot after pushing in the safety button?

A Re-set the Safety Assembly by rotating the Safety Push Knob in a clockwise direction for a few degrees. The Knob will "pop out" to re-set. (fig 14c)

Q How do I adjust the range if I only want to shoot a short distance?

A The range can be adjusted by allowing some air to escape from the projectile before shooting. Open the valve and allow the mechanism to be pressurized. Carefully open the bleed screw until you hear the air slowly escaping. Watch the gauge until the pressure has dropped to the level you require, and then tighten up the bleed screw and fire. (page 20)



<p>Q How do I know whether or not the Nozzle Valve is open on a loaded projectile?</p>	<p>A The Valve Key will only depress fully when the stem of the Valve Key is aligned with the stem of the Nozzle Valve. Depress the Valve Key in the vertical and horizontal positions. Which ever position permits the Key to fully depress will represent the position of the Nozzle Valve. If horizontal the Valve is Open. If vertical, the Valve is closed. (fig 16a - d)</p>
<p>Q Why is the pressure in the Projectile lower when I load it in the launcher than it was when I filled it?</p>	<p>A When you are filling the projectile with air it will get warm. This causes the pressure to rise and you will reach your target pressure with the air in the projectile at a temperature higher than ambient. Once air in the projectile has cooled down the air will contract and lower the pressure.</p> <p>This problem is addressed by two steps:</p> <ol style="list-style-type: none">1. Fill the Projectile Cylinder VERY SLOWLY.2. "Overfill" the Projectile by 200 psi./15 Bar – to allow for the inevitable cooling of the air after filling. See Filling, page 11)
<p>Q I installed a Projectile Cylinder and opened the Nozzle Valve, and I hear a hissing from inside the Launcher Housing – how do I stop this loss of air pressure?</p>	<p>A In order of probability, you need to do the following:</p> <ul style="list-style-type: none">• Tighten Bleed Screw on Launcher Housing. (fig 15a)• Check to ensure nylon insert is attached to the Bleed Screw. (fig 15b)• Check Nozzle Valve o-rings. (fig 24b) <p>If none of these steps solves the problem contact your Rescue Solutions International distributor.</p>



Q I accidentally tried to fire the launcher without disengaging the safety. I then tried to disengage the safety but it seems "jammed."

A When you prepare to fire the launcher the mechanism is under pressure. If you apply strong finger pressure against the trigger prior to releasing the safety, the air pressure in the mechanism will maintain your finger pressure against the Safety mechanism — even after you remove fingers from trigger — preventing it from disengaging.

To "free" the Safety and permit it to operate as intended:

- Push Trigger forward to relieve pressure
- **RELEASE SAFETY,**
- and you are all set to fire.



Service & Maintenance Record

For your protection, please ensure that this record is kept with your ResQmax and updated. When sending your ResQmax in for service, this record must be included.

Date of Purchase: _____
ResQmax Serial #: _____
Projectile Serial #: _____ Expiration Date: _____
Projectile Serial #: _____ Expiration Date: _____
Projectile Serial #: _____ Expiration Date: _____
Projectile Serial #: _____ Expiration Date: _____
Projectile Serial #: _____ Expiration Date: _____

Service Location	Date	Signature of Certified Technician
Year 1		
Year 2		
Year 3		
Year 4		
Year 5		
Year 6		
Year 7		



Limited Warranty

Rescue Solutions International Inc. warrants to the original owner, that if used, maintained and stored according to the manufacturer's recommendations, that the ResQmax is free from defects in material and workmanship for twelve (12) months from the date of the sale.

THIS WARRANTY IS LIMITED TO THE REPAIR AND REPLACEMENT OF PARTS AS NECESSARY, AND ANY NECESSARY LABOR AND SERVICES REQUIRED TO REPAIR OR REPLACE ANY PARTS TO RENDER THE DEVICE FREE OF DEFECTS. THE SOLE OBLIGATION OF RESCUE SOLUTIONS INTERNATIONAL, INC. SHALL BE THE REPAIR OR REPLACEMENT OF THE ResQmax AND UNDER NO CIRCUMSTANCES SHALL RESCUE SOLUTIONS INTERNATIONAL, INC., ITS AGENTS, SUCCESSORS, OR ASSIGNS, BE LIABLE FOR ANY DIRECT, CONSEQUENTIAL, OR OTHER DAMAGES ARISING OUT OF ANY CLAIMED DEFECT IN THE DEVICE OR THE METHOD OF ITS USE. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, WHETHER RELATING TO FITNESS, MERCHANTABILITY, OR OTHERWISE.

Except as to the express warranty set forth above, the manufacturer disclaims any and all warranties and representations relating to the product. This limited warranty shall be governed by the laws of the State of Oregon.

If you have a problem with your ResQmax, call 800.709.5018 within 90 days of discovery of the problem. You will be given instructions on where to send your ResQmax for repair or replacement. If the problem is covered by this warranty, Rescue Solutions International, Inc. will repair or replace your ResQmax, or otherwise notify you, within 30 days of receipt of the ResQmax.

Any actions for breach of warranty or breach of contract must be commenced within one year from the date of discovery of the breach.



Technical Specifications

	303 Stainless Steel	18-8 Stainless Steel	316 Stainless Steel	440C Stainless Steel	6061-T6 heat-treated aluminum	Poly- carbonate	Poly- ethylene (HDPE)	Titanium 6AL-4V Grade 5
Launcher								
Mechanism Body	■							
Quick Release Bearings				■				
Internal Springs		■						
Safety Mechanism	■							
Valve Key Mechanism	■							
Launcher Trigger	■							
Bleed Screw Body		■						
Cast-In Inserts & Fasteners		■						
Pressure Gauge			■					
Launcher Barrel						■		
Launcher Handle						■		
Line Container								
Line Container							■	
Cast-In Inserts & Fasteners		■						
Folding Stock								
Stock Body						■		
Cast-In Inserts & Fasteners		■						
Locking Slide	■							
Projectiles								
Projectile Cylinder					■			
Projectile Nozzle			■					
Nozzle Protector						■		
Grappling Hook								
Grappling Hook								■

Pressure Gauges -- Dual Scale - Metric & Imperial Units - Luminescent at short range

Filler Hose -- SAE 517 standard 108R Pressure Hose with 5,000 psi service/20,000 psi burst

Inflatable Sling Fabric -- USCG Approved UL 1191 Listed Fabric using Radio Frequency Welding Technology

Inflatable Sling Auto-Inflator -- USCG Approved Halkey-Roberts auto-inflator model #V85000

Grappling Hook -- Design Rating - Ultimate Strength of 2,200 lbs / 1,000 kg, Recommended Loads not to exceed 730 lbs / 330 kg

© 2008 Rescue Solutions International, Inc.



708 SW Umatilla Ave
Redmond, OR 97756
Phone: 800.709.5018
Fax: 541.504.9301
info@resqmax.com

www.resqmax.com





APPENDIX C. Rope Care and Usage



This page is intentionally blank.



**1012 SECOND STREET
ANACORTES, WA 98221
TELEPHONE 360-293-8488
FAX 360-293-8480
www.pсроpe.com**



ROPE CARE AND USAGE

Puget Sound Rope is committed to making the highest quality rope in the world. All of our processes and products are guided by a Quality System that meets numerous federal and international quality standards, which we feel allows us to continually meet and exceed the needs and expectations of all of our customers.

In this commitment, we have created these guidelines to assist you in the care and usage of our rope. These basic guidelines will help to ensure you get the absolute best performance and longevity out of our product and use it in the safest manner possible.

These guidelines are not intended and do not create any warranties, express or implied. Puget Sound Rope expressly disclaims warranties or representations of any kind, express or implied, including the implied warranties of merchantability and fitness for a particular purpose. Puget Sound Rope shall not be liable for any consequential, incidental or contingent damages whatsoever stemming from the use of these guidelines.



USING THE RIGHT ROPE FOR THE RIGHT JOB

There are many decisions to be made in selecting the correct rope for your application. It is strongly recommended that a complete analysis of the application is performed by a competent professional to determine the best rope for the application. Each combination of rope material and construction has its advantages and disadvantages and the selection of a rope always involves compromises based on the type of service.

Type of material used in the manufacturing of the rope. There are a number of materials commonly used to manufacture ropes. Each material has its weak points and its strong points and there is no one material (regardless of price) that is best for all applications. Because of the differences in properties, composite or blended ropes should only be used in the specific applications for which they were designed.

Design of rope. Each product design has construction variances that directly relate to the performance of the rope. It is usually best to use a design that has proven performance in applications similar to the one being specified. As in the selection of materials, there is no single design that is best for all applications.

Size of rope. The size of the rope should adequately cover the load requirements of the application. Working loads, appropriate safety factors, and rope tensile strengths should be analyzed to determine the proper size of rope.



TENSILE STRENGTHS AND WORKING LOADS

Puget Sound Rope specifications are based on industry suggested Minimum Tensile Strength (MTS) qualifications. The MTS is based on test data from a significant number of break tests conducted on new and unused rope and is a value two standard deviations below the mean. The MTS is assumed to decrease once the rope is put into use.

Maximum Working Loads (MWL) are normally determined by dividing the MTS by the safety factor. The safety factor is a function of the physical properties of the rope, the age and history of the rope, the type of service in which it is to be used, and the risks involved if failure occurs. The safety factors vary from a minimum of a 3:1 ratio, where new rope being used in a static environment and failure would cause little or no risk to equipment or personnel, to as high as a 20:1 ratio, where severe conditions exist or where failure of the rope could cause severe risk to equipment and personnel.

Since there are numerous uses for our products, it is impossible to cover all application factors. For a rope manufacturer to give blanket working load recommendation would be like a car manufacturer giving the “safe driving speed” of their car. However, if any of the following adverse conditions exist, we suggest that you use the high end of the safety factor;

- Smaller sized ropes are used (damage occurs more quickly by cuts, abrasion, and sunlight)
- The maximum loading is not known
- Dynamic loading is likely to occur
- The rope is subject to rapid cyclic loading



- Operators are poorly trained in rope handling
- Rope is not inspected on a regular basis
- Rope may be exposed to harmful chemicals
- Rope is used or stored at elevated temperatures
- Rope has been exposed to long term sunlight
- Knots are used in the rope
- Rope will be bent around small radius corners or pulleys
- Death, injury, or loss of valuable property may result from failure



DANGER TO PERSONNEL

Failure of a tensioned rope and/or attached equipment is a serious hazard and can cause snapback, which may result in death or injury to personnel. Personnel handling rope should never stand in line with or within 45° on either side of a rope under tension. Should the rope part for any reason, the recoiling rope may swing in a random path away from the failure point violently striking anything in its path. If the risk for serious damage to equipment or injury to personnel exists, the working load should be lowered substantially and the rope inspected before each use.



ROPE INSPECTION

A regular inspection cycle should be established to determine the condition of the rope. The following conditions should be looked for;

- Kinks or twists
- Heavy chafing or seriously worn surface areas
- Cut, broken or frayed strands (outer and inner strands)
- Surface fusion or melted strands
- Evidence of Chemical exposure
- Compacted or hard areas of rope
- Splice movement

Although visual inspection of your rope can not accurately predict the residual strength, it does indicate problem areas that may need attention. If any of the above conditions exist or you doubt the strength of the rope, an analysis of the safety factor ratio should be conducted.



OVERHEATING

Heat has a direct effect on the rope's tensile strength. All synthetic ropes are affected by heat to some degree. Most ropes show a gradual decrease in strength as the temperature is increased. Our catalog gives a "critical temperature" for each type of rope at which it will lose approximately 20% of its tensile strength. This strength loss is temporary and the rope will recover its strength upon cooling.

In addition to the immediate strength loss synthetic ropes also experience long term degradation referred to as "heat aging". This strength loss is permanent and accumulative. In severe cases it may be accompanied by discoloration of the rope but usually there is no visual indication of heat exposure.



ULTRA VIOLET RADIATION (UV)

The most common source of ultra violet radiation is through exposure to direct sunlight. The effect of UV exposure varies with the fiber type, protective coatings, rope size and rope construction. The larger the rope the less effect UV has on the strength since the UV radiation is absorbed in the outer layer. For the same reason jacketed ropes or ropes with surface coatings will retain their strength better. UV degradation is usually more a problem of improper storage conditions than of use conditions.



KNOTS AND SPLICING

For the best possible performance of the rope, an appropriate splice should be used to connect or terminate. Always contact the manufacturer for the recommended splice for the rope being used. Knots in ropes can cause a 60% loss of tensile strength and if used, an analysis of the safety factor ratio should be conducted.



ROPE STORAGE

The following conditions should exist when storing the rope for any period of time;

- The Storage area should be clean, dry and cool
- There should be adequate ventilation in the storage area
- The rope should be stored off the ground
- The rope should be stored away from metal walls or steam valves
- The rope should be stored away from exposure to sunlight
- The rope should be stored away from any type of chemicals



CHEMICAL EXPOSURE

Ropes may be damaged from direct contact with or from fumes of numerous chemicals. To ensure that you receive only the best performance, operators should try to avoid any acids, alkalis, solvents, paints, etc., coming into contact with the rope. The following table is provided to show the chemical resistance of our ropes when short term chemical exposure occurs on the material used to manufacture the rope.

ROPE TYPE

	<i>Plasma®</i>	<i>Spectra®</i>	<i>Nylon</i>	<i>Polyester</i>	<i>Co-Polymer</i>
<i>Common Acids</i>	Excellent	Excellent	Good	Good	Very Good
<i>Alkali</i>	Excellent	Excellent	Excellent	Very Good	Excellent
<i>Common Solvents</i>	Excellent	Excellent	Good to Very Good	Good to Very Good	Good
<i>Clorox</i>	Very Good	Very Good	Excellent	Excellent	Fair
<i>Gasoline</i>	Excellent	Excellent	Very Good	Very Good	Good
<i>Kerosene</i>	Excellent	Excellent	Very Good	Very Good	Fair - Moderate affect
<i>Hydraulic Fluids</i>	Excellent	Excellent	Very Good	Very Good	Fair - Moderate affect

C
H
E
M
I
C
A
L

In the case of chemical exposure, operators should immediately clean the rope with any type of mild detergent and then rinse completely.

Questions? Please call us at any time, we'll be happy to answer any technical or product-related questions you may have.



This page is intentionally blank.



APPENDIX D. Inspection Guidelines for Plasma® Synthetic Ropes



This page is intentionally blank.



1012 Second Street
Anacortes, WA 98221 USA
Telephone: 360-293-8488
Fax: 360-293-8480
www.pslope.com
email: sales@pslope.com

Inspection Guidelines for Plasma[®] Synthetic Ropes

Puget Sound Rope Company

Plasma ropes have been used extensively in numerous diverse applications for many years. Over this time period, particular operating conditions and hazards have been identified which are more harmful to Plasma than to steel. The presence of these conditions can best be determined by periodic inspection of the lines. This guideline presents recommendations for conducting periodic inspection by the end user

Conditions to be avoided in Plasma Lines

There are three areas where close attention needs to be paid to Plasma lines. Below are descriptions of these conditions and likely signs of their presence.

1. Repeated lateral abrasion against sharp edges. While HMPE is one of the most cut-resistant polymers available, metal can prove to be stronger than Plasma in a long-duration abrasion event. Signs of excess abrasion include strand pullouts, heavy fuzzing and cut strands in a single area, and localized bunching. It should be noted that normal light fuzzing of the Plasma rope surface is to be expected in normal use. This light fuzzing does not reduce the rated strength of the line, and actually creates a protective layer on the rope that helps to prevent further damage.





2. Plasma begins to lose strength above about 160 °F, and has a zero-strength temperature around 250 °C. Signs of high temperature damage include, melting, fused strands, and significantly reduced diameter. The



fused strands should not be confused with high-tension compression of the rope which might appear similar. With standard urethane coatings, the rope can appear melted after high tension has been applied while the rope is bent around a surface. This is normally not melting and can be worked out with little effort. The rope strength is not affected.

3. Plasma lines can lose strength if overstrained. This can be the result of exceeding the recommended design factor for an extended time period, or by instantaneous peak loads during dynamic loading events. A typical design factor is 5:1, but this should be determined in conjunction with the application engineer. Signs of overstraining can be subtle but include localized thinning and elongation, and loss in flexibility (for example the rope becomes rigid).

Inspection Guidelines for Plasma Rope

Below are some suggestions for inspecting Plasma for the above damage conditions. Each end user should develop their own method of routinely inspecting these lines for damage prior to heavy use. The method and frequency of inspection will depend on the end users experience and usage level.

1. Lay rope out under hand tension so the entire length can easily viewed.
2. Visually inspect the entire length of rope for signs of abrasion, heavy fuzzing, stiff regions, fused or melted regions or thinned areas. Make note of any damaged areas.





3. Relate any damage to service over hardware for possible situation remedies.
4. Monitor for overloading. To accomplish this, put a small (less than 10% of break load) but repeatable load on the line. In subsequent inspections a similar load should be applied again, so determine a method that will give approximately the same load each time. Put a bright mark on the line at a point just beyond the tail of the splice (one suggestion is to use a bright colored ribbon through one or two strands of the rope). Put another bright colored mark (or ribbon) approximately 20 feet down rope from first mark.). These marks will be a reference for future measurements and should be located securely. While under reference tension, using a flexible tape measure, measure the length between reference marks. Write down this reference length and compare it to previous or subsequent measurements.



5. Keep a detailed record of the line reference length as well as any damage areas and their approximate locations relative to one or both reference marks. Future inspections should be used to monitor minor damage areas for signs of growth.

Inspection Frequency

The end user should determine the frequency of rope inspections. For heavy use, the rope should be carefully inspected prior to each day's use. The user should also perform a quick visual inspection (without length measurement) prior to any use of the rope.



Rope Replacement:

Ropes that show severe damage should be replaced, repaired (damaged areas cut out and re-spliced), or down-rated to other applications. Examples of severe damage in Plasma rope include (but are not limited to):

- a. More than 2 strands severed within a 2-foot segment
- b. Fused segment that is no longer flexible (strands not separable)
- c. Segment whose diameter is 20% less than other part of the rope
- d. Melting on one side that fuses one or more strands together
- e. Rope that has lengthened (between reference marks) by more than 10%



Note: It has been found that cleaners/degreasers containing d'Limonene (citrus based cleaners) can rapidly deteriorate HMPE based ropes. Avoid contact with this chemical.

Each end user will determine through experience which signs of damage are more indicative of impending failure. (For example, the critical damage mode of a rope that fails in service might be identified if the location of the break can be traced to damage noted in a prior inspection.)

Plasma represent a significant technological breakthrough in high strength lifting lines; however, as with any synthetic fiber rope product, Plasma lines have a much better chance of meeting expectations when coupled with careful maintenance and periodic inspection.